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Multiple Engine Test System

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STATEMENT OF GOVERNMENT INTEREST

BACKGROUND

The present invention relates to a multiple engine test system. More specifically, but without limitation, the present invention relates to a test bed system that tests different types of engines.

Testing of engines, specifically, but without limitation, military aircraft engines require different test components and test cells for different engines. Currently there are designated test cells and testing areas for each type of engine. This utilizes excess space and limits the type of engine that can be tested. Historically, engine test cells, specifically turboshaft engine test cells, were built exclusively to meet the requirements of a single engine type. This required significant manpower and incurred significant costs, as well as requiring different engine test sites for each type of engine. Thus there is a need for a universal test bed and testing system.

Thus, there is a need in the art to provide a multiple engine test system that incorporates the listed benefits without the limitations inherent in present methods. For the foregoing reasons, there is a need for a multiple engine test system.

SUMMARY

The present invention is directed to a multiple engine test system that includes an engine test bed system for holding a specific engine type, a mounting frame, and a handling system for transporting the engine test bed system from storage to the mounting frame. The engine test bed system has all the peculiar testing components required for the specific engine type, and the mounting frame is able to hold the engine test bed system securely.

It is an object of the invention to provide a multiple engine test system that can test any type of engine, particularly any type of aircraft engine.

It is an object of the invention to provide a multiple engine test system that is a universal test bed and engine testing system.

It is an object of the invention to provide a multiple engine test system that is highly configurable and is able to meet different engine requirements.

It is an object of the invention to provide a multiple engine test system that reduces manpower and set-up costs.

It is an object of the invention to provide a multiple engine test system that allows use of different engine test bed systems for each particular engine type.

DRAWINGS

These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims, and accompanying drawings wherein:

Figure 1 is a perspective view of one of the embodiments of the multiple engine test system;

Figure 2 is a perspective view of another one of the embodiments of the multiple engine test system in use; and

Figure 3 is a perspective view of an embodiment of the multiple engine test system without the engine test bed system.

DESCRIPTION

The preferred embodiments of the present invention are illustrated by way of example in Figures 1, 2, and 3. As seen in Figures 1 and 2, the multiple engine test system 10 includes an engine test bed system 200 for holding a specific engine type, a mounting frame 100 and a handling system 300 for transporting the engine test bed system 200 from storage to the mounting frame 100. The engine test bed system 200 includes all peculiar testing components required for testing the specific engine type 50, and the mounting frame 100 is able to hold the engine test bed system 200 securely.

In the discussion of the present invention, the system will be discussed in an aircraft engine environment, specifically a military turboshaft aircraft engine environment, however, the system can also be utilized for any other type of engine. In addition, this system will also be discussed in an indoor testing facility environment; however, it may be utilized anywhere practicable.

The mounting frame 100 may be, but without limitation, a common platform used to hold unique engine test bed systems 200 securely. As seen in Figure 3, the mounting frame 100 may include a platform 105 or base with a pedestal 110. In the preferred embodiment, the platform 105 may be substantially rectangular and contain at least two pedestals 110. Each pedestal 110 may be substantially rectangular, smaller in size than the platform 105, and the pedestals 110 may be substantially similar in size and shape and substantially parallel. In the preferred embodiment, the engine test bed system 200 is mounted or placed on the mounting frame 100.

The engine test bed system 200 may be defined, but without limitation, as a removable engine test bed. It can also be defined as, but without limitation, a transportable turboshaft engine test bed that houses all of the detailed hardware required to perform operational and test procedures on a specific aircraft turboshaft engine 50. The engine test bed system 200 may communicate with or rest on the pedestal(s) 110. The engine test bed system 200 may contain all of the peculiar testing components 250 required for the testing of a specific engine type 50. For instance, a particular engine test bed system 200 may include, but without limitation, a dynamometer, a flywheel, and the like. The engine test bed system 200 may be customized to each particular engine 50.

The engine test bed system 200 may be a support with support beams 205, support columns 210, top beam members 215, and top member connecting beams 220. As seen in Figure 1, the preferred embodiment of the engine test bed system 200 has two support beams 205 and two top beam members 215. Each support beam 205 may communicate with or rest on a pedestal 110. The support

beam 205 may have a substantially rectangular cross section with the longer side resting on the pedestal 110. The support columns 210 are perpendicularly attached to the support beams 205. The top beam members 215 are perpendicularly attached to the support columns 210. The top member connecting beams 220 are perpendicularly attached to both top beam members 215. As seen in Figure 1, the top member connecting beam 220 may have a first end 221 and a second end 222 wherein each respective end is perpendicularly attached to a top beam member 215. On the top beam members 215 the testing components 250 may be disposed.

As seen in Figure 1, the preferred embodiment of the handling system 300 for transporting the engine test bed system 200 from storage to the mounting frame 100 includes an overhead hoist 305 which can transport the engine test bed system 200, and an overhead rail system 310. The overhead hoist 305 may ride on the overhead rail system 310. As seen in Figure 1, the overhead hoist 305 may include a hook system 306 and a cord system 307 for holding and supporting the engine test bed system 200. However, any other type of holding and supporting system may be utilized, such as, but without limitation, a magnet system, a cord system only, or a suction system. The overhead rail system 310 leads from the test area to a storage area where all the unique engine test bed systems 200 are stored. The overhead hoist 305 may also be used to move and install any engine 50 being tested. The overhead rail system 310 may also lead to an area where engines 50 are placed or stored prior to testing. The handling system 300 may take any other form that is practicable, such as, but without limitation, wheel rail system, caster rail system, standard warehouse handling system, electromagnetic type system, etc.

The multiple engine test system 10 may also include an exhaust duct 500. The exhaust duct 500 intakes air and discharge from the engines 50 when they are being tested, and transports this air and discharge either outside or to another area. Engines 50 typically have an engine exhaust which discharges engine fumes and exhaust. The exhaust duct 500 may intake these fumes and exhaust away from the test area. The exhaust duct 500 may be an adjustable exhaust duct 505 that can change sizes in order to

accommodate different types of engines 50. The exhaust duct 500 may be telescopic and extend as seen in Figure 2.

The multiple engine test system 10 may also include an engine interface harness 400. An engine interface harness 400 may be defined, but without limitation, as an apparatus that adapts specific connection requirements to the universal test cell connections 600. The engine interface harness 400 may adapt specific engines 50 to universal testing connections and components. The universal testing connections and components and specific testing components 250 may be attachable to standardized connectors and adapters 255 to obtain facilities requirements such as, but without limitation, water, hydraulics, power, etc.

The multiple engine test system 10 is shown in use in Figure 2. The engine 50 is attached to the peculiar testing components 250, the universal test cell connections 600 and to the adjustable exhaust duct 505. After testing is complete, the engine 50 may be removed from the engine test bed system 200 and the engine test bed system 200 may be removed and replaced with a different engine test bed system 200 to test another type of engine 50.

When introducing elements of the present invention or the preferred embodiment(s) thereof, the articles "a," "an," "the," and "said" are intended to mean there are one or more of the elements. The terms "comprising," "including," and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

Although the present invention has been described in considerable detail with reference to certain preferred versions thereof, other versions are possible. Therefore, the spirit and scope of the appended claims should not be limited to the description of the preferred versions contained herein.